

## CARE OF NEST AND YOUNG.

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THE sanitary condition of the nest is a matter of great concern to birds, who, as a class, are probably the cleanest of animals. This is especially true of all who breed in holes like Woodpeckers and Chickadees, the young of which are piled up in close quarters and often more than one layer deep. The Woodpecker's hole and the Bluebird's nest are always sweet and clean, and the nestlings immaculate. The parent bird not only ceaselessly carries food to the young, but is often seen hurriedly leaving the nest with a small white package in bill, an action full of significance to every member of the family.

The excrement of the nestlings of Woodpeckers and Passerine birds is surrounded by a transparent sac of mucous, which is probably secreted at the lower end of the alimentary canal, and of such consistency as to allow of its being picked up without soiling bill or fingers, a condition which undoubtedly occurs to some extent in other orders of birds. The Bluebird carries these packages several rods from the nest, and presumably drops them. Many other birds probably dispose of them in this way, but it is not commonly known that others, among which I can now certify the Robin, Cedar Waxwing, and Red-eyed Vireo, devour the whole or a part of the excrement at the nest.

The Robin has undoubtedly been seen by many in the characteristic pose shown in one of the photographs standing on the brim of the nest, and usually with head inclined, as if dotting on her young and thinking what fine children they are, when this attitude is really one of sanitary inspection. Shortly after feeding, the nestling becomes very uneasy, raises itself to its full height or tries to do so, and when possible drops the excrement over the edge of the nest. The old bird follows every movement, snaps up the excrement the moment it leaves the body, and either swallows it immediately or carries it away. When seen flying from the nest with head slightly depressed and beak outstretched

the Robin is usually engaged in errands of this kind. In considering such actions I refer particularly to the three species mentioned, which I have watched repeatedly at a distance of two feet or less for hours at a time.

Young Robins are fed and cared for by both parents. I have seen the mother Robin remove the excrement from the nest, devour it, and a moment after take it directly from the young and carry it away. Again, on the following day the same bird, after swallowing all the available excrement, fell to brooding her young and remained in this position full twenty minutes by the watch without showing the least desire to reject anything which had been eaten. I have seen the female Cedarbird come to her nest of five half-fledged young, regurgitate black cherries, and after distributing them, inspect her household with the closest attention, picking up and swallowing every particle of excrement. This mother then spread her wings over her brood, and shielded them from a hot August sun for over an hour. Meantime the male came repeatedly, and passed cherries around. The female who stood erect, straddling the nest, would occasionally inspect her brood and devour the excrement. She would also snap at every passing insect, and I saw her catch a large red ant, which was quickly transferred to the mouth of a young bird. She would erect and lower her crest, stand with mouth agape for long intervals, but there was never a sign of ejecting what had been eaten.

After watching such behavior, which I have seen repeated with slight variations many times, I am convinced that the excrement is actually and definitively swallowed, and not merely taken into the gullet to be regurgitated later. The Cedar Waxwing, however, uses its distensible gullet as a temporary receptacle for food, and it is possible that in this species the excrement goes no farther than the œsophagus, from which it is later ejected. The actions of the bird just described, however, do not favor this idea.

Not only is the nest carefully cleaned, but Robins and Vireos energetically pick their young all over, a very important function, since the minute swarming particles which infest birds' nests, known as bird lice, often cause great discomfort, and especially to the young when weakly.

Cleanliness is an imperative instinct with such birds as the Kingfishers and Bank Swallows, whose nests are placed in the ground, while Barn and Eave Swallows, House Sparrows, and Pigeons represent a considerable number of other species which secure protection by placing their nests in remote, high, or inaccessible places. While their nests may be clean, the ground beneath them usually is not.

It is plainly advantageous for birds which breed on or near the ground to remove every particle of litter which would stain or whiten the leaves and surrounding foliage, and thus advertise the secret of their nest to enemies, even to those who prowl after dusk. When a Red-eyed Vireo, whose behavior I studied at close range, dropped any bit of excrement by accident, she darted after it with such speed that it was snatched up before reaching the ground, or before falling a distance of four feet. Not a trace of defilement is ever seen around the dwellings of any of these birds.

On the other hand, predaceous species like Hawks pay no attention to such matters. The excrement of their young is voided in a semi-fluid state and in a peculiar manner. With tail turned to the edge of the nest the bird shoots it off to a distance of two or three feet, and it may strike the ground six or seven feet from the nesting tree. The only significance which such actions have is that of keeping the nest clean. The advertisement of the nest stains on the leaves below is a matter of indifference to these bold and persistent outlaws, who have little to fear from any enemy save men.

Owls, who breed in holes in trees, are reported to have filthy nests, especially where the cavity has been in use for several successive years, but this seems to be due to the remains of their quarry and to the accumulation of rejected food-pellets rather than to the presence of excrement.

The haunts of certain sea fowl are often reeking with filth during the breeding season, and the guano beds of the South American coast mark the places of assembly and probably of the breeding of myriads of sea fowl for long periods of time. However, the birds themselves and their nests are generally clean, and any other condition in the case of most birds would soon become intolerable.



FIG. 1. ROBIN ABOUT TO CLEAN NEST.



FIG. 2. ROBIN CLEANING NEST.



FIG. 1. BLUEBIRD CLEANING NEST



FIG. 2. BLUEBIRD CLEANING NEST

The cleaning of the nest and young is apparently instinctive with the adult bird, and so is also the care with which many avoid soiling the ground and foliage about their nesting sites. They apparently have no choice in these matters, but act because they must. As to eating the excrement, however, it is not so clear. We need many more observations on different individuals before a decision can be reached. If it should be proved that in the Robin, for instance, some individuals never eat the excrement while others do, as we know, we might regard the action as an acquired habit. When the pellicle breaks in the mouth, an accident which I have seen happen in the case of a Robin, the bird must swallow some part in order to get rid of it. Moreover, since digestion in the young is an imperfect process, the substance may serve as a kind of predigested or partially digested food, which might be acceptable to the old birds in times of stress, as in prolonged and heavy storms when food is not easy to procure.

The fact that the Robin removes a part of the excrement from the nest but devours the remainder would seem to imply either that it discriminates what is suited for food, which is improbable, or that this action is a habit not yet fully established, and certainly not ingrained.

#### DESCRIPTIONS OF PHOTOGRAPHS.

Plate II, Fig. 1. Female Robin inspecting nest. Fig. 2. Male Robin cleaning nest. (In act of swallowing excrement removed from nest; the adherent dead grass is from nest lining.)

Plate III, Fig. 1. Female Bluebird carrying food to young. Fig. 2. Female Bluebird leaving nest hole in act of cleaning nest. (Photographed at a distance of 18 inches.)